

# Smart Helmet Using GSM & GPS Technology

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## I. INTRODUCTION

Many people don't realize that helmets prevent skull fractures, not concussions, which are brain injuries. A high technology sensor is available in the market, I used and develops a range of Shock Box Sensors to alert parents or coaches that an "at-risk" hit has occurred, so concussion checks and protocols start as early as possible

Here I introduce "[smart helmets](#)" and mouth guards outfitted with **gps and gsm** technology radio-frequency identification to measure the location and direction of hits experienced during a accident and game or practice. The data is wirelessly transmitted to a cell phone on the sidelines, which calculates the magnitude of the hit and the location of the blow.

GSM (Global System for Mobile communications) is the technology that underpins most of the world's mobile phone networks. The GSM platform is a hugely successful wireless technology and an unprecedented story of global achievement and cooperation.

Today's GSM platform is living, growing and evolving and already offers an expanded and feature-rich 'family' of voice and multimedia services. GSM currently has a data transfer rate of 9.6k. New developments that will push up data transfer rates for GSM users are HSCSD (high speed circuit switched data) and GPRS (general packet radio service) are now available.

## II. GPS (GLOBAL POSITIONING SYSTEM)

The **Global Positioning System (GPS)** is a space-based [satellite navigation](#) system that provides location and time information in all weather conditions, anywhere on or near the Earth where there is an unobstructed line of sight to four or more GPS satellites. The system provides critical capabilities to military, civil and commercial users around the world. It is maintained by the United States government and is freely accessible to anyone with a [GPS receiver](#).

### 2.1 Basic concept

A GPS receiver calculates its position by precisely timing the signals sent by GPS [satellites](#) high above the Earth. Each satellite continually transmits messages that include

- the time the message was transmitted
- satellite position at time of message transmission

The receiver uses the messages it receives to determine the transit time of each message and computes the distance to each satellite using the speed of light. Each of these distances and satellites' locations define a sphere. The receiver is on the surface of each of these spheres when the distances and the satellites' locations are correct. These distances and satellites' locations are used to compute the location of the receiver using the [navigation equations](#). This location is then displayed, perhaps with a moving map display or [latitude](#) and [longitude](#); elevation information may be included. Many GPS units show derived information such as direction and speed, calculated from position changes.

## 2.2 APPLICATIONS

While originally a military project, GPS is considered a *dual-use* technology, meaning it has significant military and civilian applications.

GPS has become a widely deployed and useful tool for commerce, scientific uses, tracking, and surveillance. GPS's accurate time facilitates everyday activities such as banking, mobile phone operations, and even the control of power grids by allowing well synchronized hand-off switching.

Many civilian applications use one or more of GPS's three basic components: absolute location, relative movement, and time transfer.

- **Astronomy:** Both positional and [clock synchronization](#) data is used in [Astrometry](#) and [Celestial mechanics](#) calculations. It is also used in [amateur astronomy](#) using [small telescopes](#) to professionals observatories, for example, while finding [extrasolar planets](#).
- **Cartography:** Both civilian and military cartographers use GPS extensively.
- **Cellular telephony:** Clock synchronization enables time transfer, which is critical for synchronizing its spreading codes with other base stations to facilitate inter-cell handoff and support hybrid GPS/cellular position detection for [mobile emergency calls](#) and other applications. The first [handsets with integrated GPS](#) launched in the late 1990s. The U.S. [Federal Communications Commission](#) (FCC) mandated the feature in either the handset or in the towers (for use in triangulation) in 2002 so emergency services could locate 911 callers. Third-party software developers later gained access to GPS APIs from [Nextel](#) upon launch, followed by [Sprint](#) in 2006, and [Verizon](#) soon thereafter.
- **Clock synchronization:** The accuracy of GPS time signals ( $\pm 10$  ns)<sup>[62]</sup> is second only to the atomic clocks upon which they are based.
- **Disaster relief/emergency services:** Depend upon GPS for location and timing capabilities.

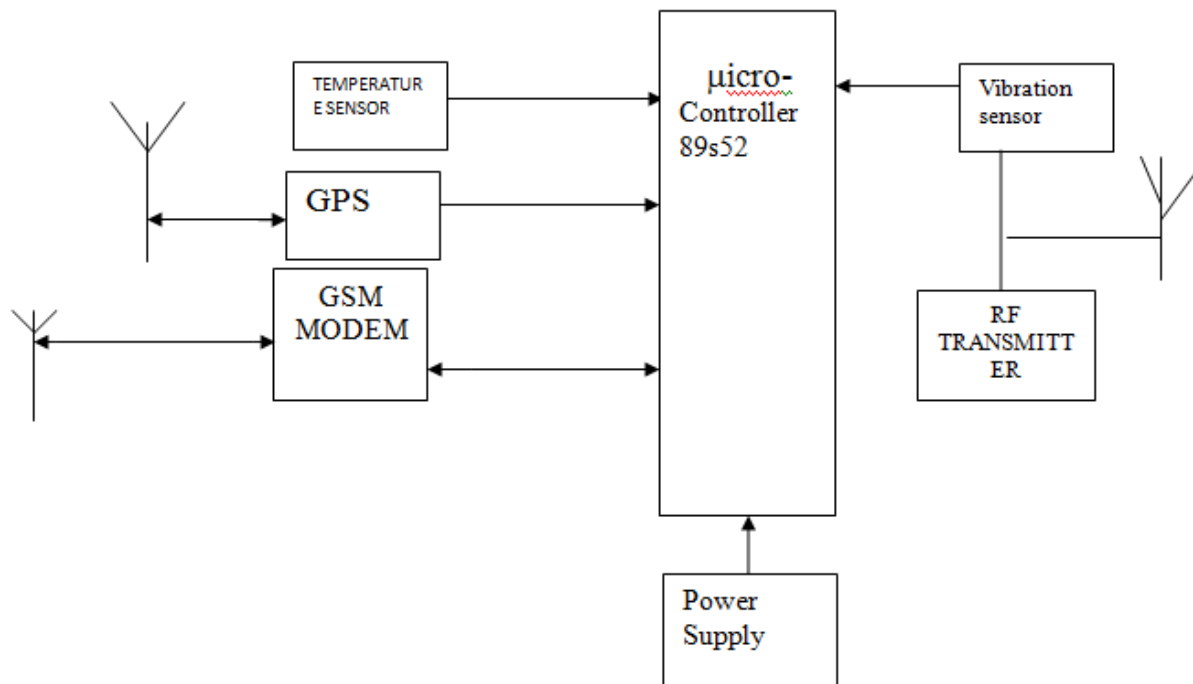
## GSM

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Ultimate project for 21<sup>st</sup> century. Now a day there is lot of burglary happening across the country. The reason behind this is the robbers are clear that the police can't make out the exact time of burglary and also they can't make out place where the burglary is happening.

So keeping this in mind, we are designing a device that uses the latest mobile technology called GSM modem technology. One advantage in this technology is that any data to be transferred can be done without any wire communication that is the wireless communication. In recent days the communication used for conversation is the mobile communication. But in this project we will use for the security purpose.



#### BLOCK DIAGRAM:

### III. VIBRATION SENSORS

The vibration / shock sensor detects shock intensity caused by sudden knocks or hits and continuous vibration due to faulty ball-bearing on fans and other equipment.

The shock levels and monitoring durations can be set for each individual sensor, enabling a user-defined profile for customer specific applications and equipment. Each sensor incorporates a unique type and serial number providing true plug and play capability. Vibration sensors are easily installed and fixed to a variety of materials using screws in the housing or with the self-adhesive material supplied. The on-board blue LED visually indicates communication online and activation

### IV. MICROCONTROLLER

#### 8-bit Microcontroller with 8K Bytes In-System Programmable Flash

##### 4.1 Description

The AT89S52 is a low-power, high-performance CMOS 8-bit microcontroller with 8K bytes of in-system programmable Flash memory. The device is manufactured using Atmel's high-density nonvolatile memory technology and is compatible with the industry-standard 80C51 instruction set and pinout. The on-chip Flash allows the program memory to be reprogrammed in-system or by a conventional nonvolatile memory programmer. By combining a versatile 8-bit CPU with in-system programmable Flash on a monolithic chip, the Atmel AT89S52 is a powerful microcontroller which provides a highly-flexible and cost-effective solution to many embedded control applications.

The AT89S52 provides the following standard features: 8K bytes of Flash, 256 bytes of RAM, 32 I/O lines, Watchdog timer, two data pointers, three 16-bit timer/counters, a six-vector two-level interrupt architecture, a full duplex serial port, on-chip oscillator, and clock circuitry.

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In addition, the AT89S52 is designed with static logic for operation down to zero frequency and supports two software selectable power saving modes. The Idle Mode stops the CPU while allowing the RAM, timer/counters, serial port, and interrupt system to continue functioning. The Power-down mode saves the RAM contents but freezes the oscillator, disabling all other chip functions until the next interrupt or hardware reset.

**TECHNICAL DATA MQ-7 ALCOHOL SENSOR**

**FEATURES**

- \* High sensitivity to carbon monoxide
- \* Stable and long life

**APPLICATION**

They are used in gas detecting equipment for carbon monoxide (CO) in family and industry or car.

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